6.1: Simple Interest

Definition.
The **simple interest** I is given by

$$I = Prt$$

where

$$\begin{aligned} I &= \text{ interest (in dollars)} \\ P &= \text{ principal (in dollars)} \\ r &= \text{ annual interest rate (as a decimal)} \\ t &= \text{ time (in years)} \end{aligned}$$

Note: The time measurements of r and t must agree

From this, the **future value** of simple interest is

$$S = P + I = P + Prt = P(1 + rt)$$

Example.

If $\$8,000$ is invested for 2 years at an annual rate of 9%, how much interest will be received at the end of the 2–year period? What will the future value be?

If $\$4,000$ is borrowed for 39 weeks at an annual interest rate of 15%, how much interest is due at the end of the 39 weeks?

An investor wants to have $\$20,000$ in 9 months. If the best available simple interest rate is 6.05% per year, how much must be invested now?

Definition.
The **return on investment** (ROI) is the ratio between the gain and cost of an investment:

$$ROI = \frac{\text{Gains on investment}}{\text{Cost of investment}}$$

The **earned (effective) interest rate** is the equivalent interest rate of the investment when all the fees and dividends are included.

Example. Mary Spaulding bought Wind-Gen Electric stock for $\$6,125.00$. After 6 months, the value of her shares had risen by \$138.00 and dividends totaling \$144.14 had been paid.

Find the return on investment on this investment.

Find the simple interest rate she earned on this investment if she sold the stock at the end of the 6 months.

Example.

To buy a Treasury bill (T-bill) that matures to $\$10,000$ in 6 months, you must pay $\$9,750$. What annual simple interest rate does this earn?

If the bank charges a fee of \$40 to buy a T-bill, what is the actual interest rate you earn?